# Purpose

The primary purpose of this project was to develop a framework for exploring my ideas about the mechanisms of our sub-conscious through programmatic means.

The human sub-conscious is a real thing, existing inside us as a “black box”, that we experience every day as it seems to “serve up” ideas and symbolic connections from somewhere below our level of awareness.

This document uses the terms intuition and subconscious interchangeably.

**The ideas it explores are based on the following observations**

* Humans must react to some events faster than we have time to logically come to an informed decision about them (CITE). However, we are able make very good “in-the-moment” approximations that seem to be “served up” subconsciously (even after the fact).
* The sub-conscious must have a Darwinian utility function, something like “is our current contextual awareness and behavior contributing to homeo-stasis, or not?”
* In our everyday experience from one context to the next is often (if not always) completely subconscious (EXAMPLE).
* Many heuristics appear to guide it.
* It is in our nature to explore ourselves and our origins.

**In an attempt to answer the following questions**

**To accomplish this**

* **An agent was built**

These are lofty goals, and so frameworks for pursuing them are necessary.

# Modeling Our Sub-Conscious

Why only 3 systems? – Can we use two under one umbrella system? After all, we can only go one layer up (it appears we can only go one level "up" - a person has the ability to think about themselves, but they cannot think about themselves thinking, therefore, there appears again to be two two primary "systems" at work - the data "filter", or "pattern recognizer" and the analytical agent.)

It is likely a feedback network receiving it’s signals from both the current environmental context and our awareness of, our “concentration on”, those signals, as it seems to guide us as much as we guide it.

But we don’t get to decide which signals it gives us, and it seems to have access to our sensory-input more holistically, where our attention tends to have tunnel-vision and miss important environmental queues (at least until our sub-conscious intuition serves them up as pertinent, that is)

## The Model

The model was constructed to represent the following

* With A arranged in this way, each ANN's output is dependent on current sensory input as well as the agent's current context.
* How is the genetic algorithm diff than just naother ann? Does it prevent overtraining
* How to simulate a positve change in the agent's environment - alter input/less noise? "Feed in what you know" (ex: concentrating)?
* The agent exists in the context of its inputs/environment and intuitively learns the symbols present in it - it might be thought of as an automatic tokenizer.
* Purpose of "mistakes" is a signal to "check in" on this process or connectoin or whatever it represents.
* The difference between this model and a single input "line" is the extensibility of memory and introduction of error into the connection-forming process.
* "Lottery scheduling", but in an evolving way - we learn an optimal schedule according to what is in our current awareness vs what isn't - it can be thought of as a temporal priroirty
* Intution vs analytical system - genetic alg decides allocation between two systems.
* We can only focus on one context at a time, how do we weight them in order to make a decision?
* How are the inputs weighted? Biased by "amount" of input and log(type)? I.e. Fire vs. TV - Fire is big and new.
* Context - an amalgamation of input from the five-senses input - we listen and see at the same time?

### Layer 1

### Layer 2

### Layer 3 – The Logical Layer

The logical layer examines the output-nodes of the intutive layer to draw concl

## Heuristics

* What heuristics might drive it and its exploration - neophilia? Self-actualization? Guilt?
* Our current awareness dictates “work” done by subconscious
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* Context - an amalgamation of input from the five-senses input - we listen and see at the same time?

## Problem Domain

Narrowing down a problem domain to facilitate exploration of this topic was tricky, but I knew I wanted it to be an environment with plenty of opportunity for the agent itself to explore, as well as one that afforded multiple symbolic contexts. For those reasons, the

# The Data

Extracted w/Pandas

Why this set? Familiar with it. Deep learnable. No conv or pool layers

Data Set desc: <https://archive.ics.uci.edu/ml/datasets/Letter+Recognition>

LEARNING\_ITERATIONS

LEARNING\_RATE

BIAS

BIAS\_WEIGHT

NETWORK\_LAYERS

NETWORK\_LAYER\_COUNT

TRAINING\_DATAFILE

VALIDATION\_DATAFILE

# Performance

* Human context switching is approx 200 ms. 20-50ms is reasonably real-time.

# Failed Approaches/Models

# What’s Next

L2 Tuning:

1. Monitor accuracy heuristics over time -

1. increase max pop size after some accuracy threshold

3. decrease max pop size if proprtion of unfit to fit outputs calls for it

Branching:

1. Branch into a hierarichal structure of agents (faciliated by reflection)

2. L2 branch after some number of increases of the last x iters

3. Each agent represents a single "concept" such as a letter, or a python kwd

4. If a branch agent does not learn enough over some t, rm it (log to kb?) - it's inputs do not form any concepts

Other heuristics:

# Influences

Tesla, Hofstadter, Kurzweil, Dawkins